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The separate existence of the Supreme Court, as an integral part of the federal government, and the unrestricted exercise of its lawful functions, is necessary in order to maintain a parity of power between the executive and legislative departments. It should operate as a check upon the legislative department in passing improper laws, and upon the executive in enforcing such laws, or committing unconstitutional acts. In England the sturdy independence and exalted patriotism of Coke and other judges in resisting the tyranny of Charles II. laid the foundation for an enlightened constitutional government in that country.

The maintenance of the integrity of the Supreme Court is necessary in order to preserve the public credit and a sound currency, because of the fluctuation of party views. It would be useless for Congress to pass a free silver bill if the Supreme Court could disannul it. Hence, the declaration in the Democratic platform of an intention to make the Supreme Court conform to legislative will.

Why was this government enabled during the Civil War to borrow immense sums of money upon its individual credit? Simply because of the confidence of lenders at home and abroad in the power and determination of the Supreme Court to enforce such obligations according to their tenor. The Supreme Court, when unhampered in the exercise of its functions, has rendered our money and our credit good in every country of the globe. This court has likewise maintained the inviolability of private contracts. Its decision in the famous Dartmouth College case disannulling an act of the New Hampshire Legislature which deprived the trustees of that institution of their lawful rights, firmly established the validity of the constitutional provision that private contracts shall not be impaired. Upon the strength and permanency of this and kindred decisions of the Supreme Court depend the stability of all tenures or titles, and the obligations of contracts.

The maintenance of the Supreme Court as an independent judicial body. and the full free exercise by it of the legitimate functions conferred upon it by the Constitution and laws, is absolutely essential to the perpetuation and growth of our free institutions, and the stability of our republican government.

George A. Benham.

AN ELECTRIC FARM.

It was never supposed by the early experimenters with electricity that their subtile agent could ever be made of any practical value to the farmers, but in the light of recent discoveries almost anything seems possible, if not probable, in the application of this fluid. Electric plows have been patented in Vienna, and electric hay-rakes, reapers, carts, and threshing machines have been placed upon exhibition in this country, and their utility tested favorably. Experimental farms have been established where nearly all the work has been performed by means of this powerful agent—fields plowed, harrowed, fertilized, and rolled, seeds planted and covered with soil, plants fertilized and weeds killed, and crops harvested and threshed. The power has been generated by erecting a large turbine wheel on some stream where the current could be depended upon to turn it. The cost of manufacturing the electricity has been reduced to a comparatively small sum in this way, and the prospects of conducting our farms in the future on an electric basis seem alluring and attractive.

But the most noticeable application of electricity to farming methods is that of employing the current to stimulate the growth of the plants. While nothing very practical has yet been accomplished in this field, the reports of the experiment farms and stations warrant one in believing that something definite may yet come out of all the labor and trouble expended. The electric garden may be a future novelty that will have for its chief recommendation a real practical utility.

Many years ago several European scientists made experiments with electricity upon plant life. Lemstrom in Finland, Spechneff in Southern Russia, and Celi in France, worked independently along the same line, applying the electric current to the seeds and the soil in which the plants were growing, and to the air immediately above the surface of the soil. Spechneff, by applying the electric current to the seeds and afterwards to the soil, raised radishes seventeen inches long and five and one-half inches in diameter. The colors of flowers were also intensified or changed according to the power and distance of the current, and the maturity of the plants was greatly hastened.

The first attempts to experiment along the lines of Lemstrom in this country were made at Cornell University about five years ago. Agricultural scientists had long recognized the valuable part that atmospheric electricity played in the life of vegetable growths, but the artificial application of it had never before been attempted. In addition to the application of electricity to the seeds of the plants, and to the soil, the experimenters at Cornell used the arc light at night. The plants receiving the bright electric rays at night, and the sunshine in the day time, were found to grow much faster than those not thus supplied with the artificial stimulant. Lettuce, spinach, radishes, and similar vegetables were brought to maturity in almost half the time ordinarily required. By applying the arc light direct to the plants their growth was so accelerated that many ran to seed before edible leaves were formed. Plants placed within five feet of the lamp died and wilted shortly after being taken out of the soil.

The effect upon flowering plants was almost as startling. The plants were made to shoot up rapidly, and under forced stimulation the stalks grew up tall, slender, and weak. The blooms were hastened in their growth, and in the case of the petunias they produced more flowers than by the old system. Verbenas, on the other hand, were uniformly injured when placed near the electric lamp. Both the leaves and the flowers were hastened in their growth, but they were small and insignificant, while many of the lower clusters died before they had reached their full expansion. The effect of the electric light upon colors was even more interesting than upon the growth of the plants. The colors of the tulips were deepened and made more brilliant, while most of the scarlet, dark red, blue, and pink flowers were turned to a grayish white. Nearly all of the flowers artificially stimulated into beauty by the electric light soon lost their brilliancy and faded much more quickly than those raised by Nature's methods.

An important part of the experiments that have been made along this line is that the crops that were not injured by the electric lights were nearly twice as large as those not exposed to the influence of the current. Lemstrom, in trying to measure the influence of the current upon growing wheat and vegetables, procured fifty per cent. more grains from a small tract of ground that was planted with a small network of wires than from a similar plot of soil not thus stimulated.

Experiments have been continued with more or less regularity at Cornell since these first discoveries, and it is probable that we will yet be able to attain the results long anticipated by agricultural scientists. Some plants have been found to have such a fondness for the electric light that they not only grow faster under its influence, but incline their heads toward the lamp. Others are injured rather than benefited, and they lose all of their valuable qualities after being exposed to the arc lights for a few nights. The question of softening the light of the lamps to suit the different plants has been in the course of investigation, and now globes of "opal" glass are used to reduce the power of the rays. An amber-colored globe is usually employed at Cornell, for the orange rays are supposed to be the most favorable to the growth of vegetation. The various effect of the different colored rays of light upon the vegetation is strange and interesting to those experimenting with the electric light.

It is doubted by many whether the arc light can be made as efficacious as the electric current supplied through wires to the soil. Lemstrom obtained his most wonderful results by this latter method, and the plants were injured less by it than many that have been subjeeted to the electric lights.

Four years ago it was currently reported that a market gardener named Rawson, living in the town of Arlington, Mass., had used the electric lights to profitable advantage. His attention was called to the effect of electric light upon plants in 1889, when the town of Arlington began to light the streets with electricity. One of the powerful lights was located near his garden so that its rays fell directly upon a bed of flowers. These plants, situated within the circuit of the light, immediately began to grow rapidly and vigorously, outstripping all others in the garden. Satisfying himself that the cause of this was the electric light, the gardener had set up in his large hothouse a lamp of the same kind. After one or two season's trial he found that he could raise more winter lettuce and radishes in a given space in much shorter time by using the arc lights, the incandescent burners not proving so suitable, while the quality was much superior. His profits were estimated to have been increased twenty-five to forty per cent. by introducing the arc lights into his greenhouse.

This was but another confirmation of the tests made before that in Europe, and later on at Cornell. Now it seems that the French scientists have been working regularly and systematically on the question also, and they have recently obtained some results that are promising. The French electric garden is more successful than any established in this country. An instrument is used to bring into play the electricity in the air, cheapening the process of supplying the current to the plants. At the present cost of generating electricity, it is doubtful if its use could be made profitable upon many farms, even though it should greatly stimulate the growth and quality of fruits and vegetables. The French instrument is supposed to reduce the cost of generation so that every farmer could avail himself of it.

The system consists of laying a network of wires in the garden where the plants are growing, and connecting them with a copper wire that runs to the top of a pole some forty to fifty feet high. This pole is surmounted by a collector, insulated by a porcelain knob. The height of the pole enables the collector to gather the electricity in the atmosphere from a wide area, and when transmitted to the garden through the wires it produces better results than the electricity generated from a dynamo. The atmospheric electricity is not by any means as strong as that from a dynamo, but its action is to stimulate the plants without injuring them.

Gardens that have been stimulated by the atmospheric electricity, gathered and distributed by the geomagnetifere, have increased their growth and products 50 per cent. Vineyards have been experimented upon, and the grapes produced have not only been larger in size and quantity, but richer in sugar and alcohol. The flowers have attained a richer perfume, and more brilliant colors. The effect on the whole has been very satisfactory, and it is hopefully expected by the French scientists that the new method of applying atmospheric electricity to plants will greatly facilitate our plants in their future growth. Nearly all of the garden vegetables grew with astonishing rapidity when stimulated by the electric current, applied first to the seeds, and subsequently to the soil in which they germinated.

It is difficult to explain the reason why the electric light or current so marvellously affects the growth of plants, but the fact that such stimulation does occur cannot be denied. One theory is that the electricity helps the plants to take up and assimilate certain valuable salts in the earth, and another that it aids them in appropriating more nitrogen of the air. Atmospheric electricity supplied naturally plays an important part in the economy of plant growth, and it has been simply a desire to test its further effect that scientists have been induced to make the experiments. Now, however, it is possible that a practical utility may be derived from the tests conducted in this and other countries.

It would be difficult to conceive the ultimate effect upon our industrial and economic life if electric gardens could be successfully established by farmers, and the yield increased fifty per cent. The product of our farms and gardens would thus be doubled, and the world's supply of food stuff be increased beyond the point of consumption, or the acreage would rapidly decrease. The profits to the farmers would not by any means be doubled. The cost of installing an electric garden would form an item of expense that they do not calculate with to-day. The cost of a dynamo or battery would be beyond their reach, but if the electricity of the atmosphere could be collected and distributed in the garden there would be some hope of their securing the current necessary for all purposes.

The use of electricity on the future model farm will be far greater than it is to-day, and it is not impossible that the horse will be crowded out of his legitimate work in this field as he has been on the city car lines. An experimental farm to show the use of this power in cultivating the fields has been established in the West. The electricity is generated by a turbine wheel, which is turned by the current of a small stream dammed up for the purpose, and the cost of the power is reduced to a minimum. Sufficient power is generated by the wheel to light the whole place, and to run the threshing machines, plow the fields, harvest the crops, and run motor bicycles or wagons anywhere within the limits of the farm. A large Western farm, consisting of thousands of acres, with a good stream of water flowing through it, could probably be conducted on a cheaper scale to-day than by steam. In fact, the owners of some of the large farms are eagerly watching the development of electric locomotion, and as soon as experiments justify their actions the steam plow, reaper, thresher, and rakes will be supplanted by those run by electricity.

GEORGE ETHELBERT WALSH.